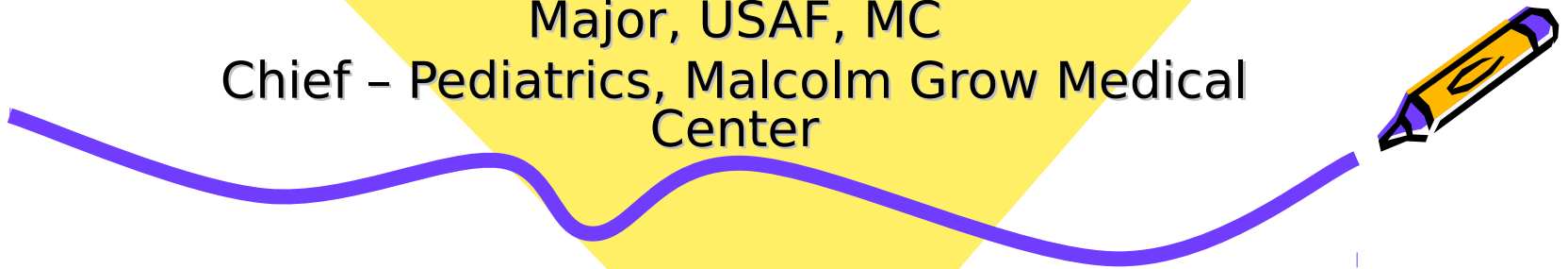


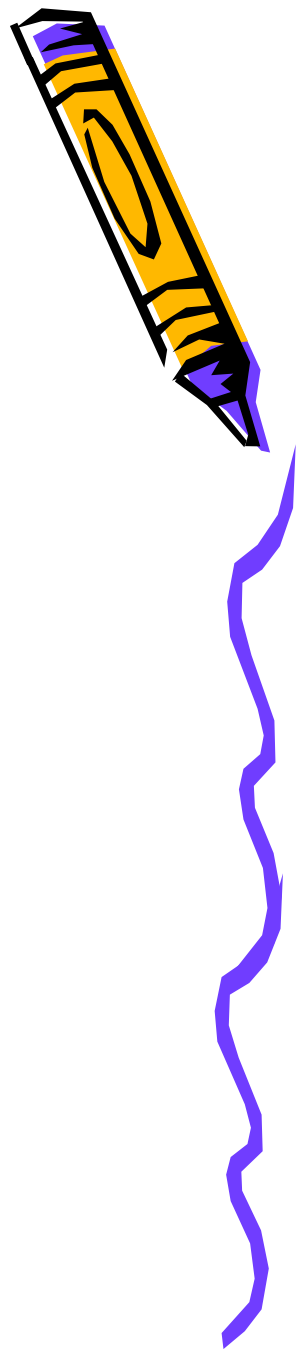


# Common Pediatric Infections

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# Common Pediatric Infections

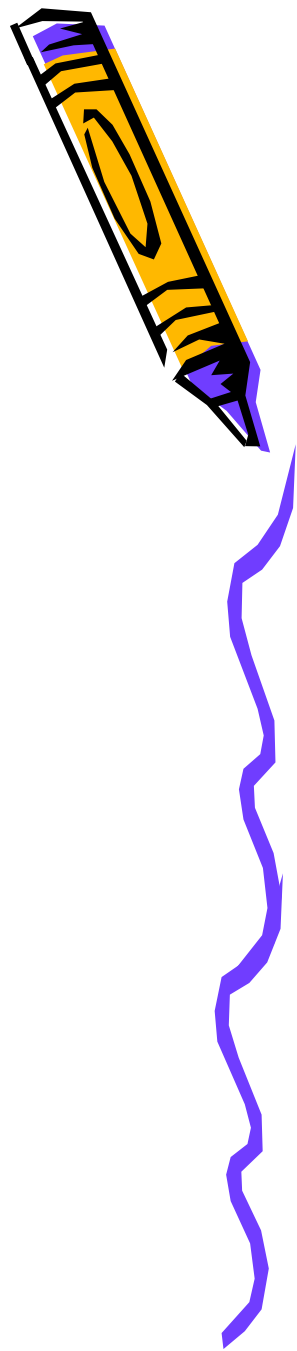


- Acute Otitis Media
  - Review of the New AAP/AAFP recommendations on treatment
- Acute Bacterial Sinusitis
  - Pathophysiology
  - Diagnosis
  - Treatment and Management

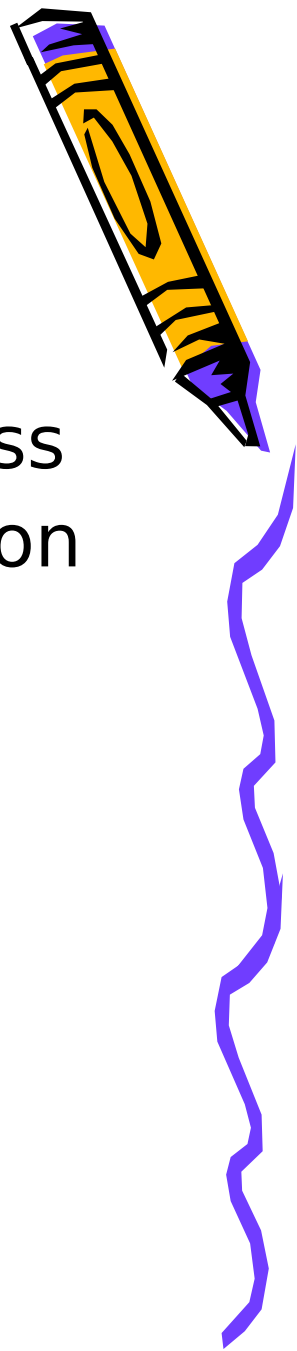


# Acute Otitis Media

- Most common bacterial illness in children
- 25 million office visits and 20 million prescriptions in 1990
- Visits decreased to 16 million in 2000 with the same prescribing rate



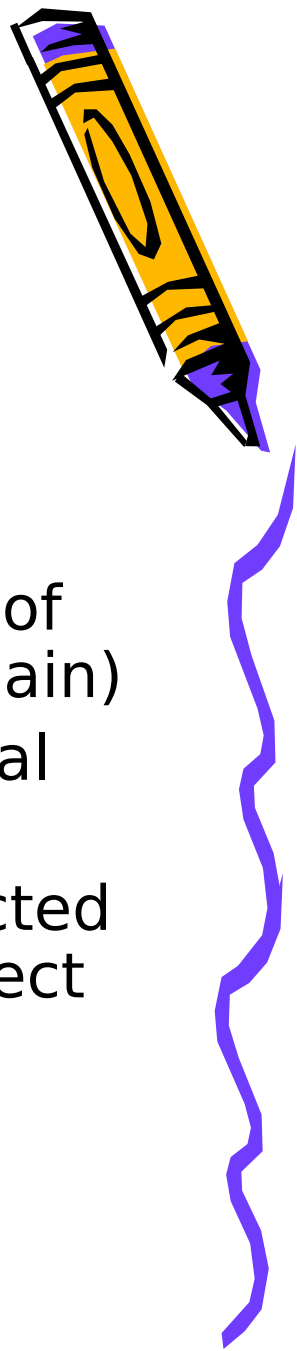
# Diagnosis of Acute Otitis Media (AOM)



- Recent, usually abrupt, onset of illness
- Presence of middle ear fluid or effusion
  - Bulging tympanic membrane (highest predictive value) , limited or absent mobility, air fluid level, or otorrhea
- Signs/symptoms of middle ear inflammation
  - Otalgia (ear tugging in infant), irritability/crying, otorrhea, and/or fever



# Management of AOM

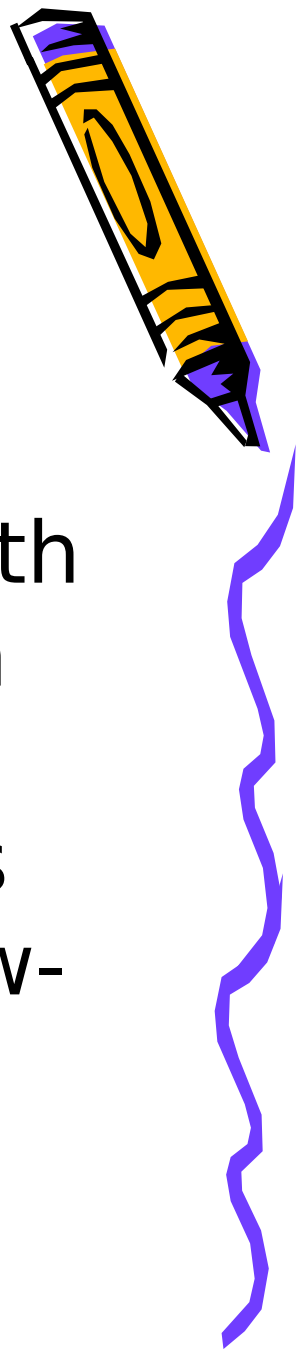


- If pain is present the clinician should recommend treatment to reduce pain
  - Acetaminophen and ibuprofen (mainstay of pain management for mild to moderate pain)
  - Benzocaine/Ametocaine/Phenazone topical agents
  - Narcotic analgesia with codeine (for selected severe pain – must way potential side effect profile)

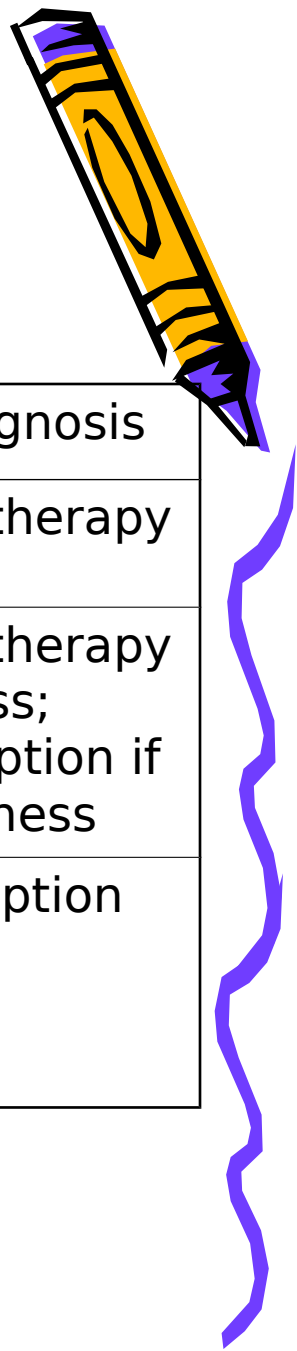


# Treatment of AOM

- Observation without use of antibacterial agents in a child with uncomplicated AOM is an option for selected children based on diagnostic certainty, age, illness severity, and assurance of follow-up.



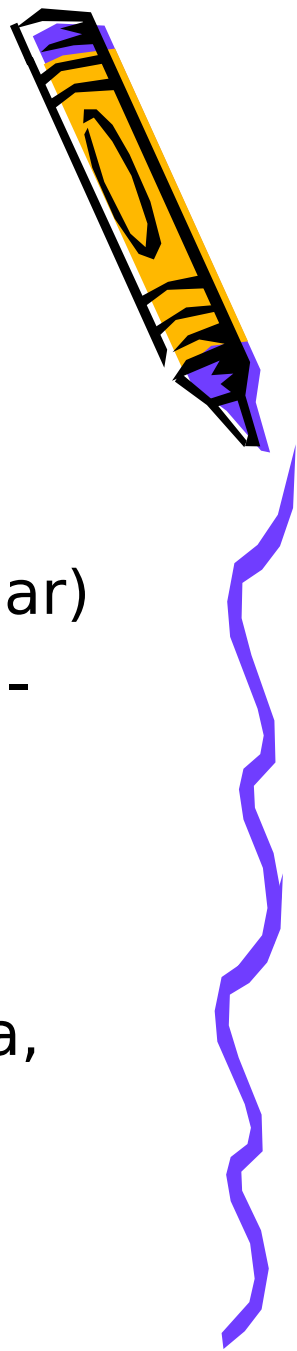
# Criteria for Initial Antibiotic Treatment vs Observation in children with AOM



AGE	Certain Diagnosis	Uncertain Diagnosis
< 6 months	Antibacterial therapy	Antibacterial therapy
6 months to 2 years	Antibacterial therapy	Antibacterial therapy if severe illness; observation option if non-severe illness
2 to 12 years	Antibacterial therapy if severe illness; observation option if non-severe illness	Observation option



# Common Pathogens in AOM

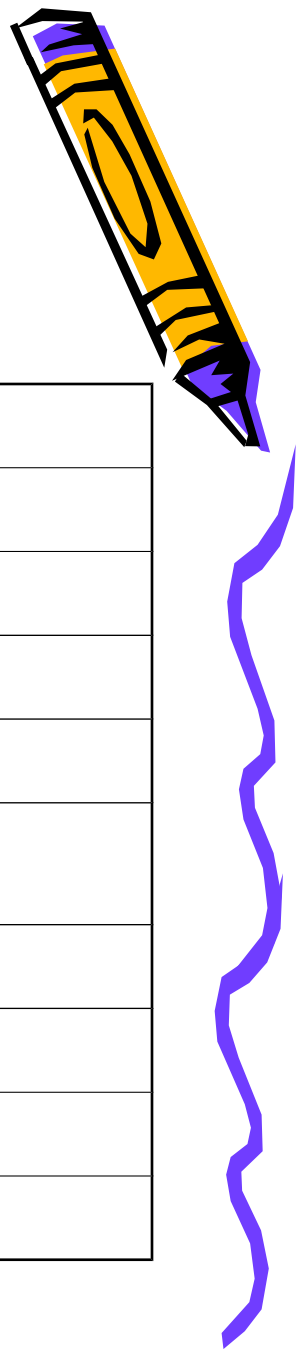


- *Streptococcus pneumoniae*: 25-50%
  - Decrease from 49 to 34% with use of heptavalent pneumococcal vaccine (prevnar)
- Non-typable *Haemophilis influenza*: 15-30%
- *Moraxella catarrhalis* 3-20%
- Viral etiologies 40-75%
  - RSV, rhinovirus, coronavirus, parainfluenza, adenovirus, and enterovirus





# Comparative AOM Outcomes for Observation versus Antibacterial Agent



<b>AOM Outcome</b>	<b>Antibacterial Rx</b>	<b>Observation</b>
Relief at 24 hours	60%	59%
Relief at 2-3 days	91%	87%
Relief at 4-7 days	79%	71%
Clinical Resolution	82%	72%
Mastoiditis/Complication	0.59%	0.17%
Persistent MEE 4-6 wks	45%	48%
Persistent MEE 3 mo.	21%	26%
Diarrhea/Vomiting	16%	-
Rash/Allergy	2%	-



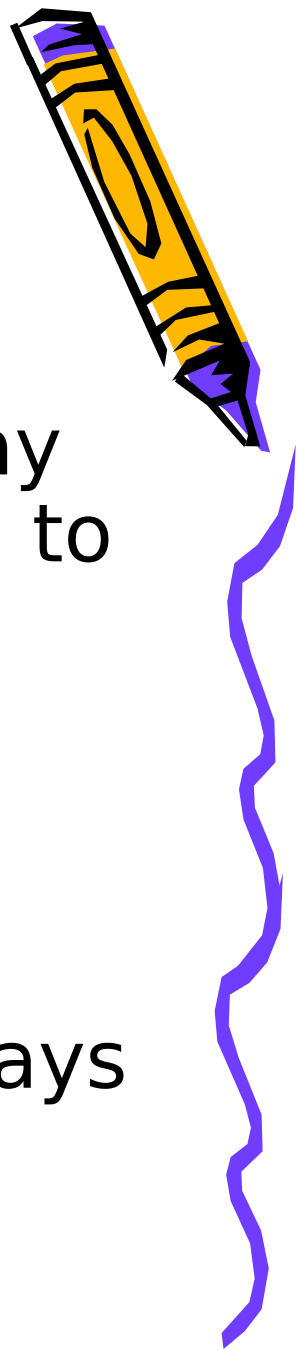
# Initial Antibacterial Agent Choice



- **Amoxicillin** 80-90mg/kg/day for 7 to 10 days
  - Higher dose to combat alterations in penicillin binding protein in *S. Pneumoniae*
- Alternates for Penicillin Allergy
  - Cefdinir, cefpodoxime, cefuroxime, azithromycin, or clarithromycin



# Second Line Antibacterial Agent Choices



- Amoxicillin-clavulante 90mg/kg/day of the amoxicillin component for 7 to 10 days
  - Consider at first line for those with severe illness (moderate to severe otalgia or fever  $>39^{\circ}\text{C}$ )
- Ceftriaxone 50mg/kg dose parenterally for 1-3 consecutive days



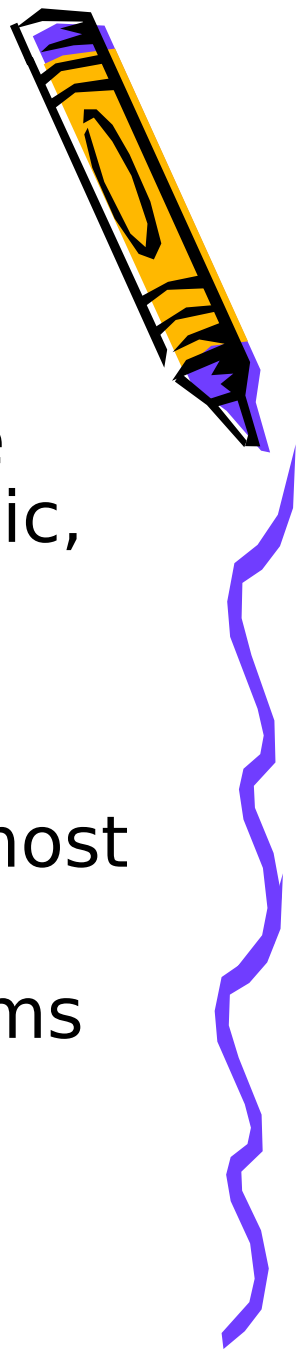
# Reduction of Risk Factors



- Implementation of breastfeeding for at least the first 6 months
- Avoiding supine bottle-feeding (bottle propping)
- Elimination of pacifier use in the second 6 months of life
- Elimination of exposure to passive tobacco smoke



# Acute Bacterial Sinusitis (ABS)



- Sinusitis describes inflammation of the paranasal sinuses – can be viral, allergic, or bacterial in origin
- Acute Bacterial Sinusitis is defined by nasal and sinus symptoms that have been present at least 10 days and in most cases less than 30.
- Chronic Sinusitis is defined by symptoms of at least 12 weeks duration.

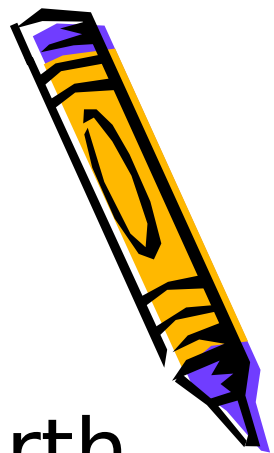


# ABS Epidemiology

- Symptoms affecting the upper respiratory tract (nasal congestion, rhinorrhea, and cough) are the most common complaint in the pediatric office
- Can be challenging to distinguish between viral URIs, allergic rhinitis, and ABS.
- Young children experience 6-8 episodes of viral URIs yearly and 5-10% are complicated by ABS.



# Sinus Development



- Maxillary Sinuses – present at birth
- Ethmoid Sinuses – present at birth
- Frontal Sinuses – develop from an anterior ethmoid cell by the 5<sup>th</sup> or 6<sup>th</sup> birthday
- Sphenoid – posterior to ethmoid air cells



# Normal Physiology of the Sinuses

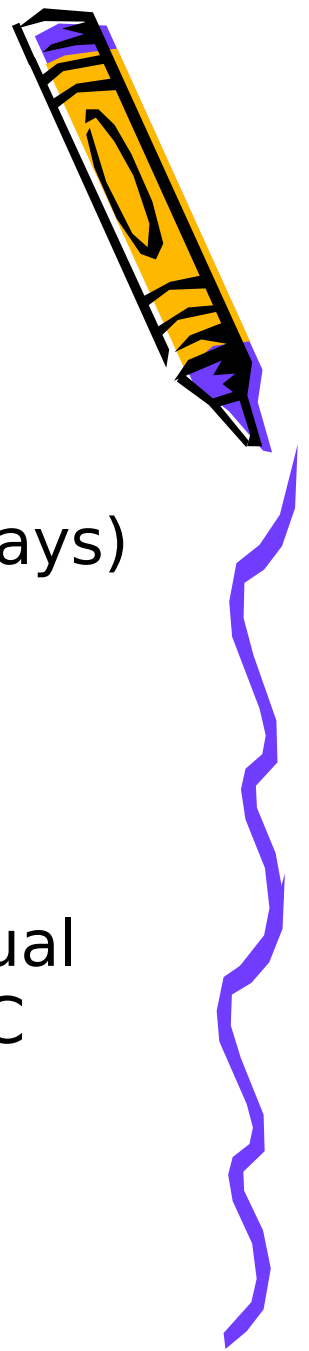


- Patency of the ostia
  - Mucosal Swelling or Mechanical Obstruction
- Function of the ciliary apparatus
- Quality of secretions





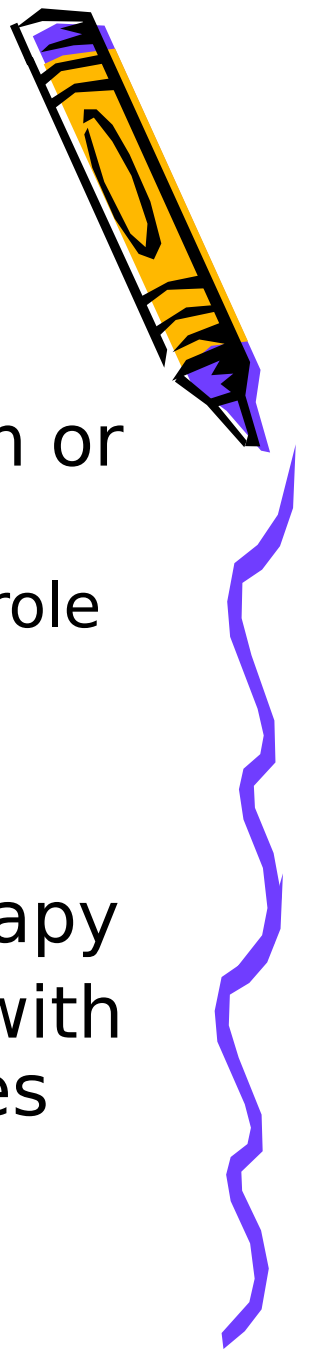
# Symptoms and Signs of ABS



- Two Common Clinical Presentations
  - Persistent respiratory symptoms (>10 days) including either nasal discharge of any quality (thin or thick; clear, mucoid, or purulent) or a cough present in the daytime, often worse at night
  - “Cold” that seems more severe than usual with severity defined as high fever  $>39^{\circ}\text{C}$  and purulent nasal discharge



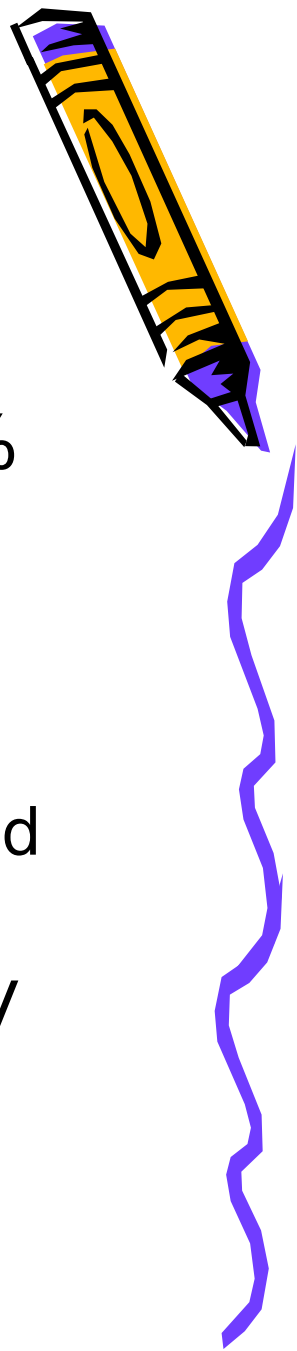
# Diagnostic Testing



- Use of radiographic imaging (plain film or CT) is controversial
  - Recent national guideline emphasize the role of clinical diagnosis
- Plain films are appropriate in older children with recurrent ABS, vague symptoms, or a poor response to therapy
- CT should be considered for patients with complicated ABS or surgical candidates



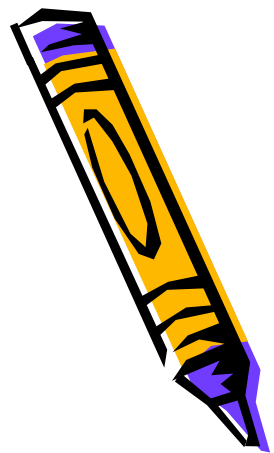
# Microbiology of Sinusitis



- *Streptococcus pneumoniae* – 30-40%
- *Haemophilus influenzae* – 20%
- *Moraxella catarrhalis* – 20%
- Viruses – 10%
  - Adenovirus, parainfluenza, influenza, and rhinovirus
- Neither Staphylococci nor respiratory anaerobes are common in ABS



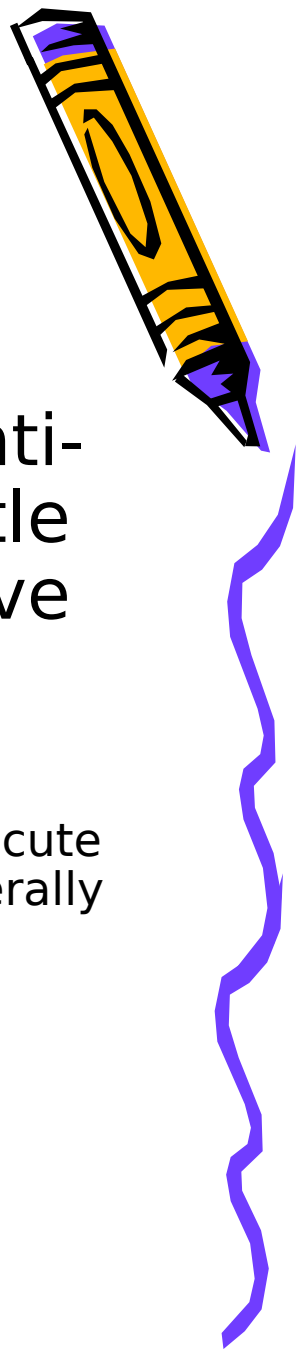
# Medical Treatment



- First Line:
  - Amoxicillin 80-90 mg/kg/day for 10-14 days
  - Longer treatments may be considered in chronic sinusitis or to avoid surgery
- Alternatives
  - Amoxicillin-clavulanate, cefuroxime axetil, cefpodoxime, macrolides
  - Consider an alternative if amoxicillin allergy, recent treatment with amoxicillin, or failure of clinical improvement on amoxicillin within 72 hours



# Adjuvant Therapies

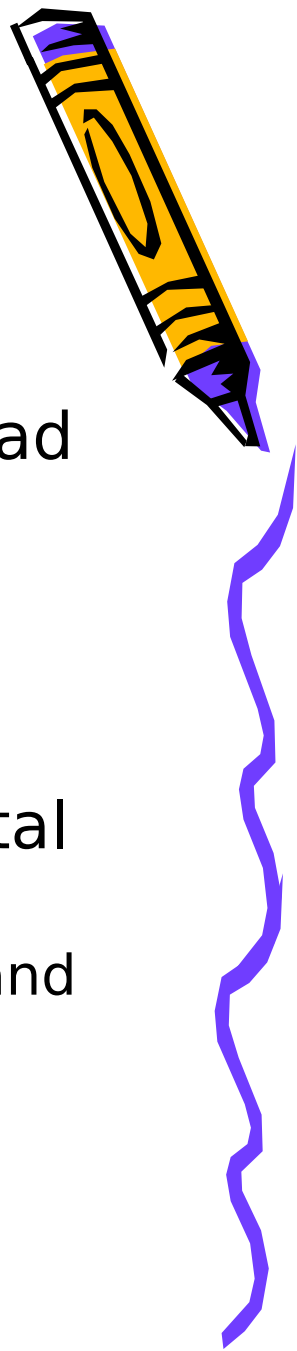


- Antihistamines, decongestants, and anti-inflammatory agents have received little evaluation in treatment of ABS and have potential for harm over benefit
- Topical Intranasal steroids
  - Rapid onset prompts consideration for management of acute symptoms, very modest beneficial effects does not generally justify their use
- Nasal irrigation with saline has shown positive effect in some patients



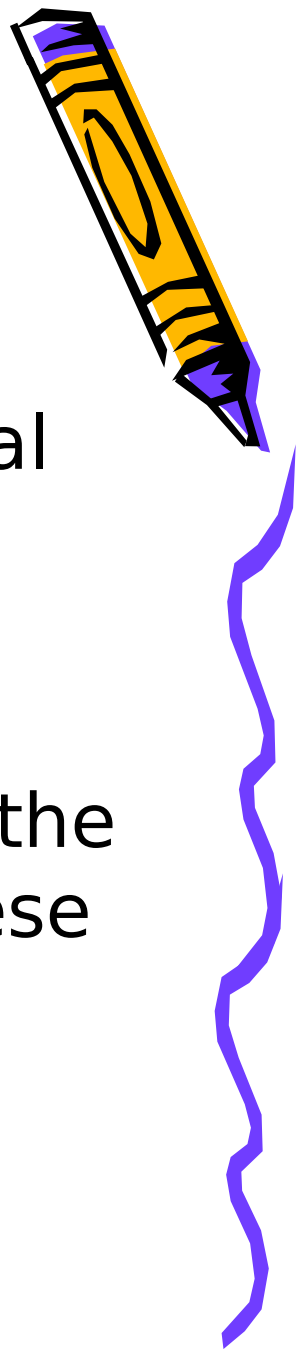
# Complications and Surgical Considerations

- Most are rare and involve contiguous spread of infection to the orbit, bone or central nervous system
- Patients with ABS rarely require surgical intervention unless they present with orbital or central nervous system complications
  - When patients have chronic or recurrent ABS and fail to improve with maximal medical therapy, sinus surgery may be considered



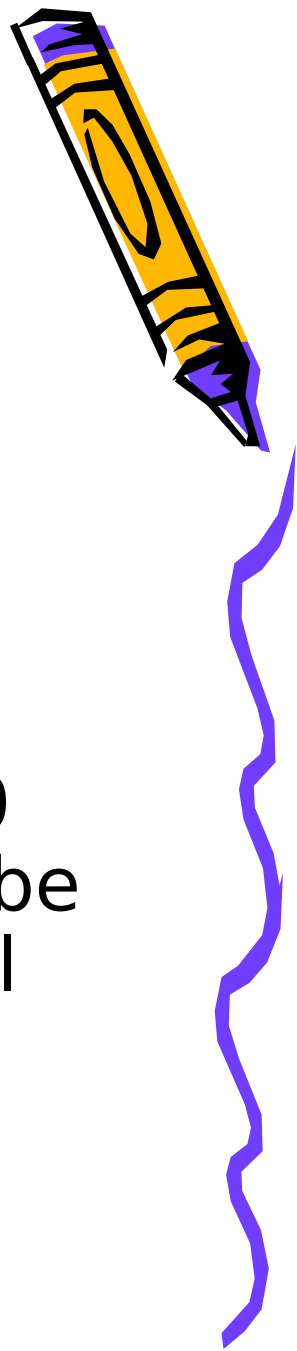
# Summary

- Acute otitis media and acute bacterial sinusitis are the 2 most common bacterial infections treated in the pediatric outpatient arena
- Clinical history and examination are the hallmark to proper diagnosis and these conditions rarely require additional diagnostic testing



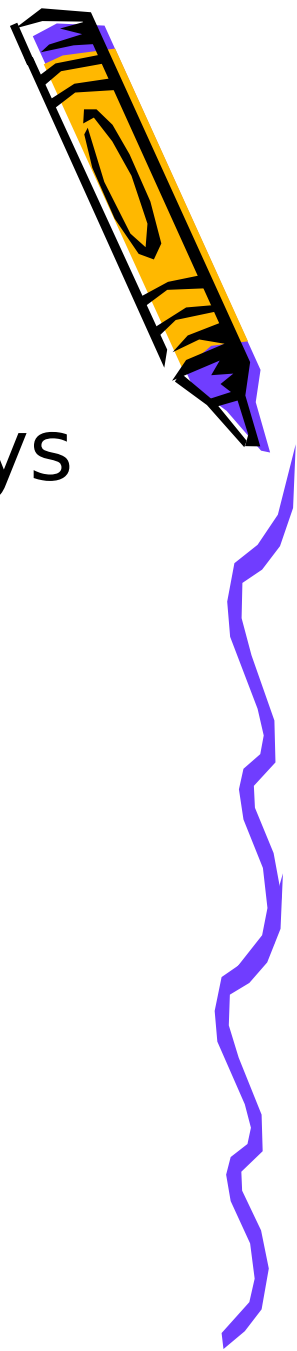
# Summary

- Understand the newer observation recommendations and when appropriate to treat AOM
- Use of pain medications
- Amoxicillin at 80-90mg/kg/day for 10 days (up to 14 days for ABS) should be considered the first line antimicrobial agent





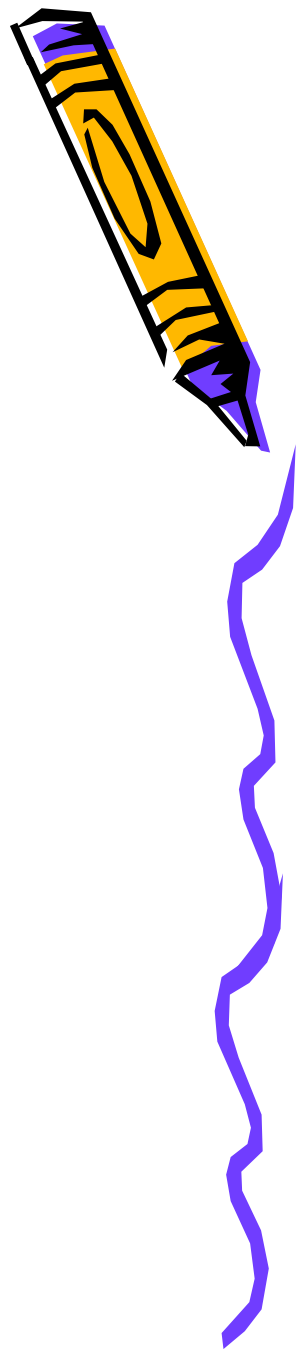
# Review Questions



- The bacterial pathogen that plays the largest role in acute otitis media is:
  - A) *Haemophilis influenzae*
  - B) *Streptococcus pneumoniae*
  - C) *Moraxella Catarrhalis*
  - D) *Staphylococcus aureus*



B) *Streptococcus  
pneumoniae*

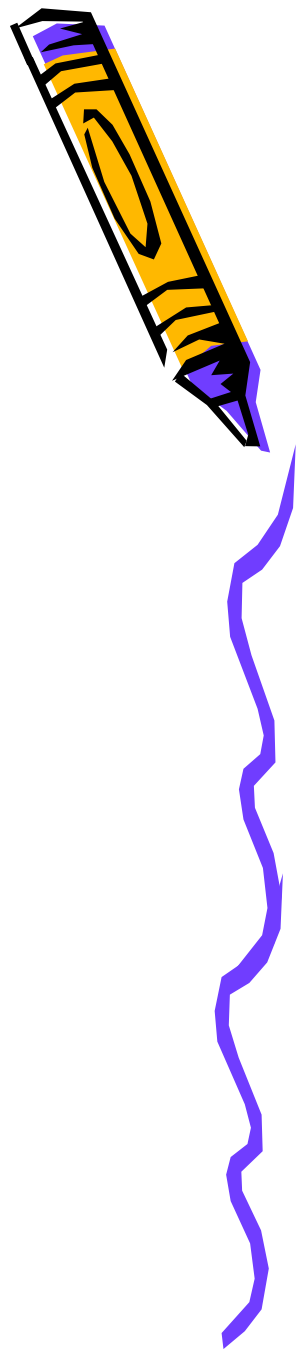


# Review Questions

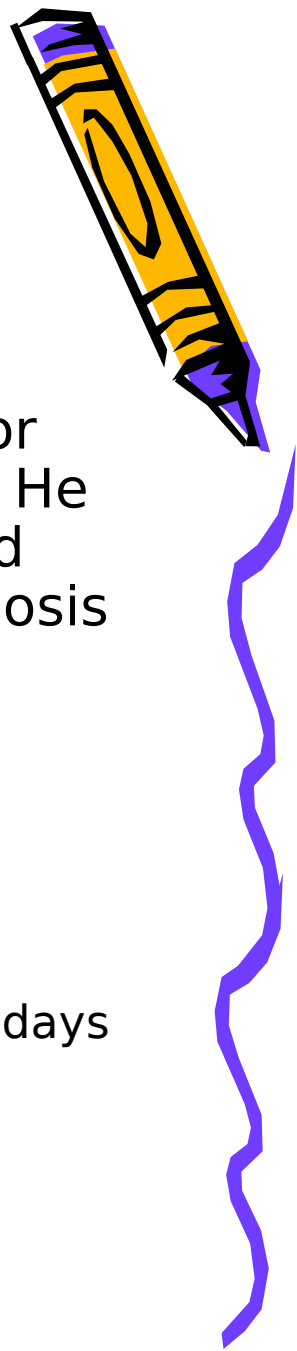
- You see a healthy 5-year-old girl with no significant past medical history in your office for ear pain that started last night. She has no fever and is otherwise well. You diagnose acute otitis media. Your best initial management is:
  - A) Treatment with amoxicillin 40-50mg/kg per day
  - B) Treatment with amoxicillin 80-90mg/kg per day
  - C) Myringotomy and treatment only if cultures are positive for a bacterial etiology
  - D) Treatment with acetaminophen for pain and follow-up in 2 to 3 days if no change in symptoms or if symptoms worsen



D) Treatment with acetaminophen for pain and follow-up in 2 to 3 days if no change in symptoms or is symptoms worsen

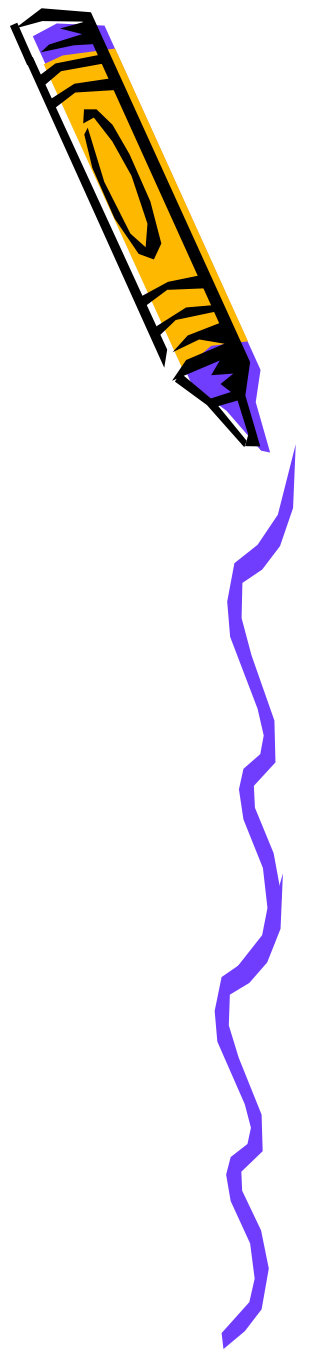


# Review Questions



- You are seeing a 15-month-old boy in your office for ear tugging, excessive crying, and fever of 39.5C. He is otherwise healthy though last month he received amoxicillin for treatment of AOM. Today you diagnosis AOM. Best management at this time includes:
  - A) amoxicillin 80-90 mg/kg per day
  - B) cefuroxime axetil
  - C) ceftriaxone parenterally 50mg/kg per day
  - D) amoxicillin-clavulaunate 80-90 mg/kg per day of the amoxicillin component
  - E) treatment with acetaminophen and follow-up in 2 to 3 days





D) amoxicillin-  
clavulaunate 80-90 mg/kg  
per day of the amoxicillin  
component



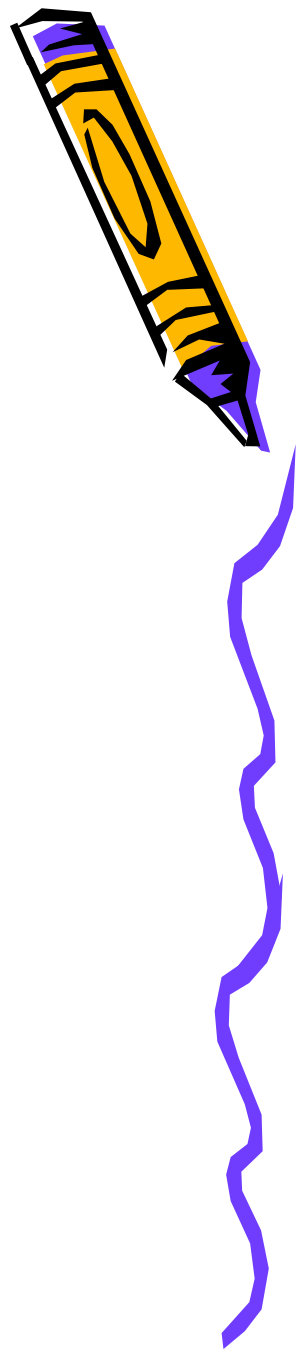
# Review Questions



- In considering empiric therapy for a 7-year-old boy in whom you suspect acute sinusitis, you should prescribe:
  - A) amoxicillin 80-90 mg/kg per day
  - B) cefotaxime 300mg/kg per day
  - C) Cefuroxime axetil
  - D) Erythromycin succinate
  - E) Sulfamethoxazole - trimethoprim



A) amoxicillin 80-90  
mg/kg per day





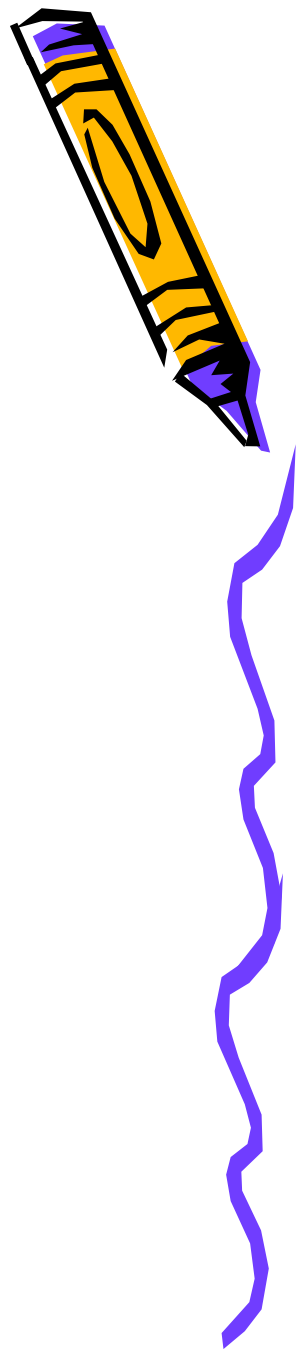
# Review Questions



- Acute bacterial sinusitis is best distinguished from a viral upper respiratory tract infection by:
  - A) cough
  - B) duration of symptoms for greater than 10 days
  - C) facial pain and headache
  - D) presence of fever for 1 to 2 days
  - E) purulent nasal discharge



B) duration of  
symptoms for greater  
than 10 days

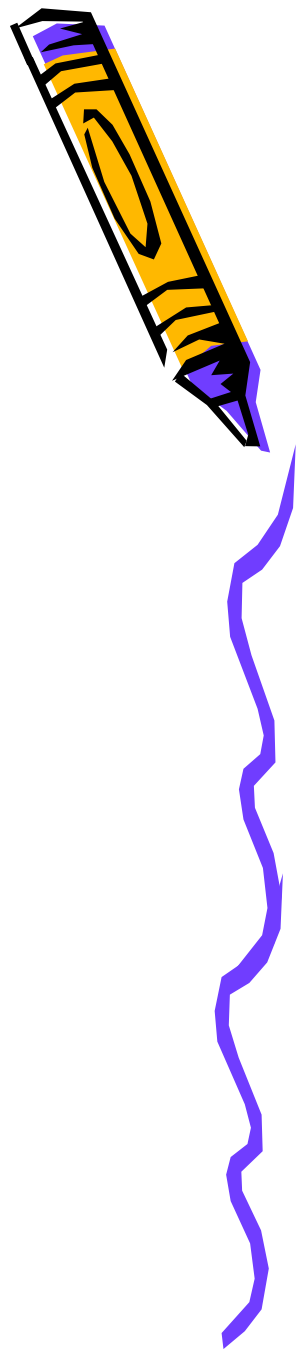


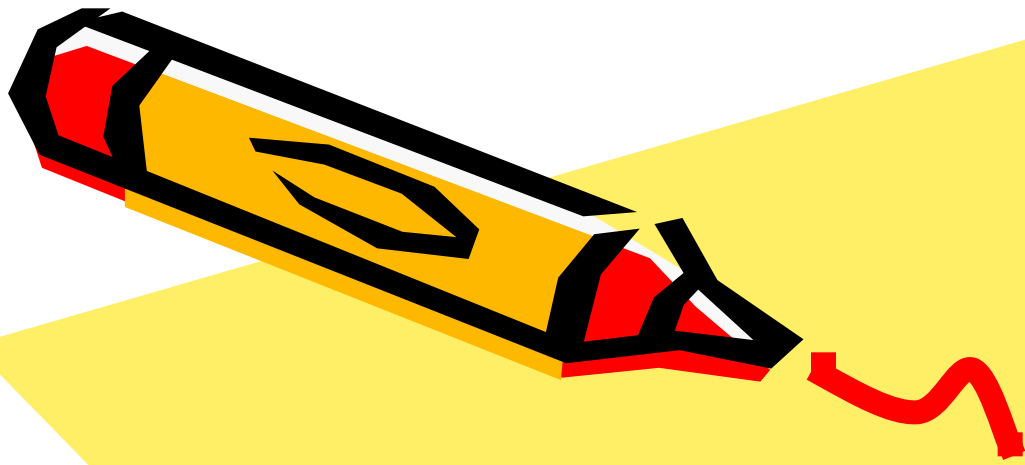
# Review Questions

- A diagnosis of acute bacterial sinusitis should be based on:
  - A) a precise clinical history regarding quality and duration of symptoms
  - B) bacterial culture from the nasopharynx
  - C) CT of the paranasal sinuses
  - D) physical examination of the nose and pharynx
  - E) plain film radiographs of the paranasal sinuses



A) a precise clinical  
history regarding  
quality and duration of  
symptoms





Questions???

